SUMMARY: TESTING FOR TOXIC POLLUTANTS

DEP REGULATIONS CHAPTER 530.5

EFFECTIVE DATE: OCTOBER 12, 1994

INTRODUCTION

Both state and federal law require the DEP to regulate the discharge of toxic pollutants into the waters of the State. The DEP's initial rules regulating toxics (Chapter 584 Regulations) became effective in May of 1993. However, due to differences between state and federal program requirements, implementation of Chapter 584 became more expensive for dischargers and more difficult for DEP than had been anticipated. As a result, DEP re-opened the rule-making process and, in October of 1994, adopted new rules (Chapter 530.5) to replace Chapter 584.

The purpose of this summary is to explain the provisions of the DEP's new Surface Waters Toxics Control Program rules as they relate to testing for toxic pollutants; specifically, to explain, in a question and answer format, who must do what kind of toxics testing when.

WHO MUST DO TESTING?

Unless exempted or given a waiver from testing, the following dischargers must perform testing for toxic pollutants:

- All industrial facilities discharging process waste water to surface waters. "Process waste water" includes any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any material or product.

- All publicly owned treatment works (POTWs) discharging to surface waters.

- All other dischargers of waste water which the DEP determines may be toxic.

WHO IS EXEMPT FROM TESTING?

Unless evidence exists that the discharge is toxic, the following dischargers are all exempt from toxics testing:

- Schools.

- Facilities licensed for less than 50,000 GPD of domestic waste water and accepting no holding tank wastes containing toxic chemicals.

- EPA-minor POTWs (< 1 MGD) which have a dilution ratio of at least 1000:1 based on licensed flows, and receive no influent from sources subject to EPA numerical pretreatment standards for toxics.

- Municipal CSO discharges subject to a CSO abatement program.

CAN TESTING BE WAIVED?

Yes, testing can be waived for industrial dischargers who demonstrate that the facility does not (1) use toxic pollutants in toxic amounts in its processes, (2) use or create chemicals that are known or suspected to form toxic pollutants in toxic amounts, and (3) process or treat waters known or suspected to contain toxic pollutants in toxic amounts.

CAN TESTING BE REDUCED?

Yes. After three years, testing can be reduced for municipal dischargers who demonstrate that:

- The POTW is not required to have an EPA pretreatment program; and
- The POTW receives less than 10% of its influent flow from sources subject to EPA numerical pretreatment standards for toxics; and
- The POTW has completed or received credit for 5 years worth of screening and subsequent surveillance tests, and the testing demonstrates no exceedance or reasonable potential for exceedance of water quality criteria; and
- Since the last screening tests:
    - There have been no increases in the number, type, or volume of waste water inflows to the POTW that may cause the receiving water to become toxic; and
    - There have been no changes in the condition or operation of the POTW, or in stormwater collection or infiltration/inflow affecting the POTW, that may increase the toxicity of the discharge; and
    - There have been no increases in the type or volume of hauled wastes accepted by the POTW.

Testing can be reduced for municipal dischargers to any frequency deemed appropriate by the DEP.

Testing can also be reduced for industrial dischargers who:

- Identify all toxic pollutants used in its processes;
- Demonstrates that the facility does not use or create chemicals known or suspected to result in the formation of toxic pollutants in toxic amounts in the discharge; and
- Demonstrate that the facility does not process or treat waters known or suspected to contain toxic pollutants in toxic amounts.

Any reduced testing for industrial dischargers must still require testing adequate to characterize the toxicity of known pollutants used in or created by its processes.

WHAT TYPES OF TESTING ARE REQUIRED?

There are two types of toxics testing required :

- Whole Effluent Toxicity (WET) testing involves the direct observation of the toxic effects of an effluent sample on aquatic test organisms. There are two types of WET tests, acute and chronic.

    - An acute WET test is a test of short duration (usually less than 4 days) focusing on the survival of the test organisms. The endpoint of the test is measured as an acute no observed effect level (A-NOEL).

    - A chronic WET test is a test of long duration (usually more than 4 days) focusing on sublethal effects (such as on growth and reproduction) on the test organisms. The endpoint of the test is measured as the chronic no observed effect level (C-NOEL).

- Chemical specific testing (often called priority pollutant testing) involves the analysis of an effluent sample for levels of priority pollutants, as listed by EPA, and for other toxic pollutants that the DEP believes may cause a specific discharge to violate water quality standards in the receiving water. All chemical testing shall be conducted by methods that allow detection of a pollutant at existing levels in the effluent or that achieve minimum levels of detection as specified by the DEP.

In addition, there are two levels of testing:

- Screening level tests must be performed during the year preceeding the filing of an application for license renewal, and each successive year unless waived by the DEP or replaced by surveillance level tests.

- Where screening level tests demonstrate that the discharge does not cause or have a reasonable potential to cause or contribute to a violation of water quality standards, surveillance level tests are performed each year until screening level tests are again required in the year prior to the next license renewal application.

All toxics testing must be performed on effluent samples representative of normal operating conditions. Whenever both WET tests and priority pollutant tests are required, they must be performed on a split sample of effluent.

WHEN DOES TOXICS TESTING HAVE TO START?

For dischargers whose license has already expired or will expire before the end of 1995, and unless credit has been given for previous testing, screening level tests must start on the following schedule:

- For high frequency testing, during the first quarter of 1995.
- For medium frequency testing, no later than the second quarter of 1995.
- For low frequency testing, no later than the third quarter of 1995. (NOTE: Where WET testing is being done to meet both EPA and DEP requirements, testing may have to start in the second quarter in order to use salmonids that are less than 60 days old.)

For dischargers whose license expires after the end of 1995, screening level tests must begin one year prior to license expiration or within 90 days of notification by the DEP.

CAN CREDIT BE GIVEN FOR PAST TOXICS TESTING?

Yes. Credit can be given to dischargers whose license has expired or will expire before October 12, 1995 for up to 3 years worth of required toxics tests performed since October 12, 1991 in accordance with DEP or EPA protocols. Credit will be given as follows:

- Acute and chronic WET tests for acute and chronic WET test requirements, respectively.
- LC50 acute WET tests for chronic WET test requirements on the same test organism if the test result (in percent effluent) exceeds the chronic receiving water concentration (in percent effluent) by a factor of 10 or more.
- NOEL acute WET tests for chronic WET test requirements on the same test organism if the test result (in percent effluent) exceeds the chronic receiving water concentration by a factor of 3 or more.
- Priority pollutant tests if the results indicate that the discharge does not have a reasonable potential to cause or contribute to violations of water quality standards.

Dischargers subject to high frequency WET or chemical specific testing will still be required to conduct at least one test per year after credit is given for past tests.

CAN CREDIT BE GIVEN FOR SLUDGE TESTING?

Yes. Where deemed appropriate by DEP, testing for organic priority pollutants conducted on sludge generated at POTWs may be substituted for future effluent chemical specific testing. POTWs seeking this credit must provide DEP with priority pollutant analyses of an effluent sample and a sludge sample collected on the same day.

WHAT TEST ORGANISMS ARE USED IN WET TESTING?

WET testing is always done with at least two test organisms, one an invertebrate (lacking a backbone), and one a vertebrate (having a backbone).

	Testing	Test Species	
Discharge to:	Frequency	Invertebrate	Vertebrate
FRESHWATER*	>1 test per year	• Waterflea	• half with Fathead Minnows • half with Salmonids**
	1 test per year	• Waterflea	• low and medium frequency testing with Salmonids** • high frequency testing with Fathead Minnows***
MARINE WATER	all frequencies	• acute only: Mysid Shrimp • chronic only: Sea Urchin	• Inland Silverside

* Includes estuarine (tidal) waters where salinity in the receiving water does not preclude the use of freshwater organisms for testing purposes.

** Brook trout or other Salmonid as approved by DEP.

*** To be replaced by Brook Trout or other Salmonids when accepted by EPA.

WHAT IS THE REQUIRED SCHEDULE FOR TESTING?

Unless testing is reduced or waived by DEP, all subject dischargers must carry out WET testing and chemical specific testing on the following schedule:

WET TESTING FREQUENCY*

	Number of Tests		
Frequency	Screening	Surveillance	Dischargers Covered**
HIGH	4 per year	1 per year	• All industrial process water dischargers • POTWs with dilution ratio < 20:1 • POTWs with EPA pretreatment program • POTWs with at least 10% of average daily influent from sources subject to numerical pretreatment standards • POTWs with unresolved toxicity problems
MEDIUM	2 per year	1 per year	• POTWs with dilution ratio ≥ 20:1 but < 100:1 • POTWs with > 0% but < 10% of average daily influent from sources subject to numerical pretreatment standards
LOW	1 per year	1 per year	• All POTWs not included in either high or medium frequency groups

CHEMICAL SPECIFIC TESTING FREQUENCY*

	Number of Tests		
Frequency	Screening	Surveillance	Dischargers Covered**
HIGH	4 per year	1 per year	• All industrial process water dischargers • POTWs discharging > 1 MGD • POTWs with EPA pretreatment program • POTWs with at least 10% of average daily influent from sources subject to numerical pretreatment standards • POTWs with unresolved toxicity problems
MEDIUM	2 per year	1 per year	• POTWs with > 0% but < 10% of average daily influent from sources subject to numerical pretreatment standards
LOW	1 per year	1 per year	• All POTWs not included in either high or medium frequency

* Tests must be spaced equally over the testing period.

** Where applicable, influent and effluent flow rates are based on licensed limits.

WHAT PROCEDURES ARE REQUIRED FOR CHEMICAL SPECIFIC TESTING?

Chemical specific testing (including sample collection, preservation and analysis) must be conducted using the procedures described in the latest editions of the following publications:

- Standard Methods for the Examination of Water and Wastewaters. American Public Health Association, Washington, DC.

- Methods for Chemical Analysis of Water and Waste. Environmental Monitoring and Support Laboratory, Office of Research and Development, US Environmental Protection Agency, Cincinnati, Ohio.

- A. S. T. M. Standards, Part 23, Water, Atmospheric Analysis. American Society of Testing and Materials, Philadelphia, PA.

WHAT PROCEDURES ARE REQUIRED FOR WET TESTING?

WET testing must be conducted using the procedures described in the latest editions of the following EPA approved methods manuals, except as modified on a case-by-case basis by the DEP, and as described below for testing using brook trout or other salmonid species:

EPA Approved Methods Manuals

- Weber, C.I. et al., 1988. Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Water to Marine and Estuarine Organisms. Office of Research and Development, USEPA, Cincinnati, Ohio. (USEPA 600/ 4-87/ 028)

- Weber, C.I. et al., 1988. Short term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Water to Freshwater Organisms (Second Edition). Office of Research and Development, USEPA, Cincinnati, Ohio. USEPA 600/ 4-89/ 001.

- Weber, C.I. (ed.), 1991. Methods for Measuring the Acute Toxicity of Effluent and Receiving Waters to Freshwater and Marine Organisms (Fourth Edition). Office of Research and Development, USEPA, Cincinnati, Ohio. USEPA 600/ 4-90/ 027.

Salmonid Survival and Growth Tests

The Salmonid survival (acute) and growth (chronic) tests shall follow the procedures for the Fathead Minnow larval survival and growth tests detailed in EPA's Methods Manuals (listed above), with the following modifications:

Species: Brook Trout, or other salmonid approved by the DEP.

Age: Less than 6 months old for the first test each year, and less than 12 months old for subsequent tests. (NOTE: Where a WET test is being done to satisfy both DEP and EPA testing requirements, the age of the salmonid used must be less than 60 days.)

Size: The largest fish must not be greater in size than 150% of the smallest fish.

Loading Rate: < 0.5 g/l/day.

Feeding Rate: 5% of body weight 3 times daily (15%/day).

Temperature: 12° ± 1° C.

Dissolved Oxygen: 6.5 mg/l (aeration if needed with large bubbles [> 1 mm diameter] at a rate of < 100/minute).

Dilution Water: Receiving water upstream of discharge, or other water approved by the DEP.

Dilution Series: A minimum of 5 effluent concentrations (including the instream waste concentration at 7Q10 river flow and monthly average discharge flow limit for chronic test, and 1Q10 river flow and daily maximum discharge flow for acute test); a receiving water control; and control of known suitable water quality.

Exception: Where license limits exceed 100% (LC50>100%, NOEC>100%, etc.), an undiluted (100%) effluent concentration may be used instead of the 5 dilutions.

Duration: Acute = 48 hours.

Chronic = 10 days minimum.

Test acceptability: Acute--Minimum of 90% survival in 2 days.

Chronic--Minimum of 80% survival in 10 days; minimum growth of 20 mg/gm/d dry weight in controls (individual fish weighed, dried at 100° C to constant weight and weighed to 3 significant figures).

The scientific names for the WET test species are as follows: Waterflea (Ceriodaphnia dubia); Fathead Minnows (Pimephales promelas); Brook Trout (Salvelinus fontinalis); Mysid Shrimp (Mysidopsis bahia); Sea Urchin (Arbacia punctulata).

WHO CAN CONDUCT TOXICS TESTING?

WET testing can only be conducted by a DEP-approved lab; a list of approved labs throughout New England is attached. Chemical specific testing can be performed by any laboratory that is certified by the Maine Department of Human Services and that can test to DEP-required detection limits using EPA-approved methods. A current list of priority pollutants and required detection limits is attached. For current information on certified labs, contact the DHS Lab Accreditation Program (Michael Sodano), telephone 207-287-3201.

ARE THERE SPECIAL FORMATS FOR REPORTING TEST RESULTS?

Yes. WET test results should be reported on a standardized WET Test Report form that have been developed by DEP. There are two versions of this form (one for freshwater tests, the other for marine tests), and a copy of each is attached.

Chemical specific test results should be reported in a two column format, as shown below, for all priority pollutants and any other required chemical compounds. Concentrations should be reported in parts per billion (ppb), with compounds not analyzed reported as NA and compounds not detected reported as < the applicable detection limit.

Chemical Compound	Concentration (ppb)
2-CHLOROPHENOL	5.3
2,4-DICHLOROPHENOL	< 2.7
2,4-DIMETHYPHENOL	NA

Chemical specific test results should be submitted in hard copy (paper) and on disk (please use 3.5" MF2HD double sided 2MB capacity disks in the following format, in order of preference: Microsoft Excel, Lotus 1-2-3, ASCII Text, or other compatable format).

WHEN AND TO WHOM DO TOXICS TESTING RESULTS HAVE TO BE SUBMITTED?

All new toxics testing results must be submitted as soon as available to the appropriate DEP plant inspector along with the next monthly discharge monitoring report (DMR). Addresses and telephone numbers of the DEP's regional offices are as follows:

Southern Maine Regional Office, 312 Canco Road, Portland ME 04103 (207-822-6300)
Central Maine Office, State House Station 17, Augusta ME 04333 (207-287-3901)
Eastern Maine Regional Office, 106 Hogan Road, Bangor ME 04401 (207-941-4570)
Northern Maine Regional Office, 1235 Central Dr., Presque Isle ME 04769 (207-764-0477)

ARE LISTS AVAILABLE IDENTIFYING SPECIFIC DISCHARGERS WHO ARE EXEMPT FROM AND SUBJECT TO TOXICS TESTING?

Yes. Lists of POTWs and process waste water dischargers subject to or with an exemption or waiver from toxics testing, as well as a list of other dischargers submit to testing, are available from the DEP.
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